

FAO/NORWAY GOVERNMENT COOPERATIVE PROGRAMME – GCP/INT/648/NOR²³
REGIONAL WORKSHOP ON
FISHERIES MONITORING, CONTROL AND SURVEILLANCE
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THE SOUTH PACIFIC FORUM FISHERIES AGENCY MCS PROGRAMME

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TABLE OF CONTENTS

1. Introduction
 2. Background
 3. Achievements
 4. Ongoing initiatives
 - 4.1 MCS training and member country assistance
 - 4.2 Observer programme
 - 4.3 Vessel Monitoring System
 5. Summary
- Sources used
- Annex A-1 Operator's VMS questionnaire
Annex A-2 VMS questions and answers for FFA member countries (Fact sheet)

23. [Inter-regional Programme of] Assistance to developing countries for the implementation of the *Code of Conduct for Responsible Fisheries* – Sub-programme C: Assistance to developing countries for upgrading their capabilities in monitoring, control and surveillance (MCS)

24. Fisheries Adviser

LIST OF ABBREVIATIONS

ALC	automatic location communicator
DWFN	distant-water fishing nation
EEZ	exclusive economic zone
FFA	South Pacific Forum Fisheries Agency
FFC	Forum Fisheries Committee
GPS	global positioning system
ICOD	International Centre for Ocean Development
LES	Land Earth Station
MCS	monitoring, control and surveillance
SPC	South Pacific Commission
UNCLOS 1982	UN Convention on the Law of the Sea, 1982
VMS	vessel monitoring system

1. INTRODUCTION.

Offshore fisheries are difficult to control, especially for small island developing countries where controlling infrastructure is very limited. This is exacerbated by the temptation of considerable revenues being a lure for many distant-water fishing nations (DWFNs) distant-water fishing nations (DWFNs) distant-water fishing nations (DWFNs) in their attempts to minimize the impact of ongoing efforts to implement sustainable fisheries resource management. The example of the progress of the South Pacific Forum Fisheries Agency (FFA) South Pacific Forum Fisheries Agency (FFA) South Pacific Forum Fisheries Agency (FFA) in representing its 14 island developing member countries, with the assistance of two industrialized members, Australia and New Zealand, has been highly successful. At the time of writing, FFA member countries were Australia, Cook Islands, Federated States of Micronesia, Fiji, Kiribati, the Republic of the Marshall Islands, Nauru, New Zealand, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu. It is an example to small island developing countries, and to many industrialized nations, as to what can be achieved with political will and the collective, cooperative efforts of regional member countries. It has demonstrated the ability to maximize benefits from donor funding for monitoring, control and surveillance (MCS) monitoring, control and surveillance (MCS) monitoring, control and surveillance (MCS) activities. The FFA MCS programme is briefly reviewed from its inception to the recent implementation of the vessel monitoring system (VMS) which “went live” in June 1998 in the western and central Pacific region.

FFA is one of six regional organizations in the South Pacific under the general guidance of the South Pacific Forum ("The Forum Secretariat").

The Forum Secretariat, based in Fiji, addresses key regional coordination, policy and development issues, including transportation and communications, at the Chief Executive level of its member countries. The South Pacific Commission (SPC) South Pacific Commission (SPC) South Pacific Commission (SPC), in Noumea, now renamed the Pacific Community, with its Oceanic Fisheries Programme, addresses fisheries and marine science issues for the members. The South Pacific Applied Geoscience Commission (SOPAC), in Fiji, addresses seabed and applied

geoscience issues. The South Pacific Regional Environmental Programme (SPREP) in Samoa is self-explanatory; and the Women's Bureau addresses the enhancement of women in development.

The FFA addresses fisheries management and the regional MCS programme for its member countries. The success of this latter aspect of FFA – the MCS programme – is a primary focus of this paper.

2. BACKGROUND.

The western and central Pacific is host to the most productive tuna fishery in the world, with landed volumes in excess of 1.4 million t/year and an estimated value of \$US 1 700 million. Industrialized DWFNs, including the USA, Japan, Taiwan (Province of China) and South Korea, take most of the tuna catch, mostly in the 200-nautical-mile exclusive economic zones (EEZs) exclusive economic zones (EEZs) of Pacific island nations. The tuna resources – principally skipjack, yellowfin, bigeye and albacore – migrate through a vast oceanic environment of over 30 000 000 km² of seas in the EEZs of the island countries, with their land mass of only 550 000 km², which is less than 2% of the total area. The tuna resources represent an important resource for the future development and prosperity of the Pacific islands. They rely on the income derived from fishing access fees, and many FFA member countries are developing their own infrastructure and fishing fleets to harvest the resources. It was determined early by the South Pacific island states that a regional approach was necessary to assess, manage and derive the optimum sustainable economic benefits from these resources. It was in this frame of mind that 16 South Pacific Island states decided to form the South Pacific Forum Fisheries Agency in 1979.

The FFA MCS Programme commenced in 1985, with a grant from a small Canadian Crown Corporation, the International Centre for Ocean Development (ICOD) International Centre for Ocean Development (ICOD), which specialized in ocean sector development. ICOD provided the services of two Canadian MCS Specialist Advisers to the FFA for the first five years of the programme, plus a Law-of-the-Sea Legal Specialist for the same period. These were the seeds from which sprung the MCS cooperation amongst the 16 member countries of FFA, with particular emphasis on the 14 small island developing states. The country member representatives have met in fora on 35 official occasions since 1985 on fisheries matters. The MCS representatives, many being variously fisheries, navy or police officials, have met annually 11 times as a regional surveillance officers committee, commencing in 1986, and now once officially as the first MCS Working Group, in Fiji in March 1998. The MCS Programme required considerable efforts to generate support and acceptance of the idea of regional cooperation in a field regarded by many as involving sensitive national intelligence. When one looks back, however, on the achievements of the FFA MCS Programme, the success story becomes evident and the progress over the years is a demonstration of the level of commitment of the member countries, the trust that has been built between the member countries and the FFA, and the considerable efforts, commitment and professionalism of the staff of the MCS Division over the years.

3. ACHIEVEMENTS.

The achievements of the MCS Programme include many of the initiatives of the FFA Legal Division, without whom the legislative base to support the management activities could not have been reached. These two divisions must, of necessity, for the success of any resource management programme, work very closely together. The measurement of the achievement therefore can be seen through a review of the programmes initiated, and also the treaties and agreements between the member countries. During this review, it must also be noted that the Legal Division has

assisted the member countries in the review and revision of their fisheries legislation to reflect their responsibilities under the UN Convention on the Law of the Sea of 1982 (UNCLOS 1982) UN Convention on the Law of the Sea of 1982 (UNCLOS 1982) UN Convention on the Law of the Sea of 1982 (UNCLOS 1982), the United Nations Implementing Agreement of 1995, and the various regional agreements and MCS activities. FFA MCS staff have assisted in MCS training, and also in the establishment of observer and MCS operational programmes for member countries. Further, a technical specialist of the MCS Division has since 1990 also been assisting the member countries in their boundary delimitation exercises. These activities are in addition to the achievements considered below.

In reviewing these agreements and achievements, it must also be remembered that the MCS Division grew from a one-person unit in 1985 to a Division which now includes: the regional coordination of operations for air surveillance and vessel monitoring systems (VMS) vessel monitoring systems (VMS); management of the regional observer programme and assistance for nation observer programmes; technical MCS assistance for planning, operations and training for MCS programmes; and advisory support to the recent multilateral, high-level conference meetings with DWFNs.

The Convention establishing the South Pacific Forum Fisheries Agency (the FFA Convention) was opened for signature on 10 July 1979, and has been ratified by all 16 member countries. It is through this Convention that the Forum Fisheries Committee (FFC) Forum Fisheries Committee (FFC) receives its legal mandate for its activities and programmes.

The mere achievement of getting the surveillance personnel of each country together each year to discuss and agree on collective steps for implementation of regional controls was the first success, in 1986 at the first Regional Surveillance Officers' Meeting. Issues discussed in the 12 years since then have included the establishment of the regional register, licensing, terms and conditions of access, observers, reports, etc. These meetings still continue annually and are the forum for development of regional MCS initiatives.

MCS issues came to the fore early in the MCS programme when the Treaty on Fisheries Between the Governments of Certain Pacific Island States and the Government of the United States of America (the Multilateral Treaty of Fisheries) was signed in 1987 and came into force in 1988. This Treaty dealt with the financial package, licensing, terms of fishing access for USA tuna vessels, and later with the regional observer programme. It was re-negotiated in 1991 and 1992, to come into force on 15 June 1993 at the expiration of the first treaty. This single treaty formed the base for many MCS initiatives, including the harmonized terms and conditions for licensing, the regional register, the observer programme, and report requirements for both FFA member countries and the then SPC, now the Pacific Community. The implementation of the USA Lacey Act provisions was an international legal breakthrough, which has been used by many countries and is now incorporated in FFA member country legislation.

The first discussion on regional Cooperation in the Management of Fisheries of Common Concern (the Nauru Agreement) was signed by six of the seven initial parties on 25 February 1982, and ratified by all parties on 28 May 1985. There have been two implementing arrangements under this Agreement, the most notable being the initial discussions and agreement for harmonization of minimum terms and conditions for foreign fishing vessel access, at the FFC meeting in Nauru in 1991. This formed the base for the development of the Harmonized Minimum Terms and Conditions for Foreign Fishing Vessels Access currently incorporated in the legislation of several FFA member countries, and last amended by the 34th FFC, in November 1997. This document established common regional licence forms; control and monitoring of transshipment; maintenance and submission of catch logs in member country zones and on the

high seas; vessel reporting requirements; observers; appointment of agents; vessels in transit; enforcement; flag state/fishermen's associations responsibilities; and also introduced the concept of VMS.

The success of the FFA in getting the member countries to agree on the Convention for the Prohibition of Fishing With Long Driftnets in the South Pacific (the Wellington Convention) on 29 November 1991, which entered into force on 17 May 1992, was a major achievement for FFA's MCS programme for conservation of the South Pacific highly migratory species.

The 22nd FFC, in Alofi, Niue, adopted the Procedures for the Operations of the Regional Register of Foreign Fishing Vessels which details the registration requirements; implementation of good standing requirement; according of good standing; criteria for withdrawal or suspension of good standing; procedures for withdrawal of good standing or for suspension thereof; reinstatement, etc. It is noteworthy that the document includes the implementation of the FAO Standard Specifications for the Marking and Identification of Fishing Vessels; administrative notes for guidance; the application for registration; and penalties by each member country for infractions in its zone.

Some of the small island developing member countries have neither the finances nor infrastructure to carry out MCS activities in their coastal waters or their EEZs. This led to the development of the Niue Treaty on Cooperation in Fisheries Surveillance and Law Enforcement in the South Pacific Region, which was opened for signature on 19 July 1992. This Treaty entered into force on 20 May 1993 and has been ratified by 13 of the 16 member states. It established general terms for cooperation amongst member countries, covering, *inter alia*, general enforcement; implementation of harmonized minimum terms and conditions of fisheries access; exchange of information; fisheries surveillance and law enforcement; prosecutions; and enforcement of penalties.

The member countries, courtesy of the legal division of FFA, have a pro forma subsidiary agreement and guidelines to implement the Niue Treaty, as a reference in inter-country negotiations.

A recent workshop in Honiara in May 1998, for the enhancement of in-country, inter-agency MCS coordination mechanisms, emphasized to the member country participants the future benefits of such cooperation with respect to fisheries MCS intelligence sharing, especially in light of the activation of the regional VMS.

The Palau Arrangement for the Management of the Western Pacific Purse Seine Fishery was the next achievement of FFA, in Suva, Fiji, in October 1992, signed by eight parties and which came into force on 1 November 1995. This arrangement details the requirement for annual management meetings to discuss purse seine fisheries management; MCS activities; allocation of numbers of licences and criteria for the determination of this allocation; plus the formation of working groups, as required, to address special issues.

The Federated States of Micronesia Arrangement for Regional Fisheries Access of 3 November 1994 came into effect on 23 September 1995. The intent of this arrangement is to provide the terms and conditions for priority access to a fishery for vessels under the national flag of, or based in, the member countries. This arrangement is to promote the nationalization of the tuna fisheries in the region in order to maximize sustainable economic benefits to the FFA member countries.

It is noteworthy that all FFA member countries have signed the United Nations Convention on the Law of the Sea of 1982 (UNCLOS 1982), and that 12 of the 16 members have ratified this Convention.

Twelve of the FFA member countries have signed or ratified the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish stocks and Highly Migratory Fish Stocks. This Agreement established guidelines and standards for the implementation of the conservation and management measures of UNCLOS 1982. Although not yet in force, the spirit of this Agreement is being incorporated in the ongoing, wider, regional fisheries initiative for the Multilateral High-Level Conference on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific. This initiative involves the FFA member countries in discussions with the DWFNs, aiming at reaching agreement on a wider regional fisheries organization which would extend the area of current FFA member country management to include the eastern waters of the Philippines and Indonesia. The third conference on this subject was held in Tokyo June 1998. A draft proposal or a convention was circulated in advance of the meeting. The challenges facing the FFA MCS Programme and set out in the draft proposal included:

- (i) the area of jurisdiction of the wider regional body;
- (ii) the inclusion, or exclusion, of the progressive steps of the FFA MCS Programme in the wider regional programme;
- (iii) the continuation of the FFA observer programme as both a compliance and science programme, or whether to confine it to science only;
- (iv) an agreement for an adequate MCS programme to control the DWFN fishing fleets and achieve conservation on the high seas;
- (v) the continued implementation of common standards established over the years by FFA member countries, including standards for: licensing; observers; access; and VMS; and
- (vi) the continued requirement for FFA and the ability of member countries to support the two organizations – this being in great part dependent upon the scope of authority for the new organization. If the Convention is only for the high seas, and therefore results in a small secretariat, then FFA will definitely be required to continue as the voice for the small island developing countries of the South Pacific. If the scope is for an area overlapping that of FFA, it is projected that discussions will eventually come around to the financial capability of member countries to support two organizations with overlapping responsibilities.

4. ONGOING INITIATIVES.

4.1 MCS training and member country assistance

The FFA MCS staff are active in the region in training, boundary delimitation, assisting in surveillance and enforcement activities, such as port inspections, etc. FFA also developed a *Fisheries Officers' Boarding Manual*, in 1994, to assist in the training of member country surveillance and enforcement staff.

4.2 Observer programme.

There is an extensive and detailed, three-week Observer Training Course, which is provided by the FFA Observer Coordinator. This course is a basic requirement for all certified regional observers, and is also run for member country observers upon request by national programmes.

The regional observer programme for the USA Treaty vessels has been the basis for the training of observers in the region. As noted, the member country observers' programmes are styled on the same training as the regional programme. One current initiative is a proposal for the regional harmonization of observer duties. There are several legal bases for a harmonized observer programme: UNCLOS, Article 62 (4); FFA Convention, Article IV; Nauru Agreement, Article II; Second Arrangement Implementing the Nauru Agreement Setting Forth additional Terms and Conditions to the Fisheries Zones of the Parties, Article 3; the Multilateral Treaty on Fisheries, Part 7 of Annex I; Niue Treaty Article III and VI; and the Federated States of Micronesia Arrangement for Regional Fisheries Access, Article 17. All of these refer to observer programmes for the region.

These supporting legal opinions are currently being discussed as a mechanism to enhance the efficiency of developing a standard regional observer programme. This would also facilitate cross-boundary coverage if desired by member countries, and thereby increase the coverage and continuity of the programme as vessels moved between member states zones.

4.3 Vessel Monitoring System.

In 1988, a few industrialized countries were experimenting with satellite technology for the purposes of vessel tracking. Many systems have since been developed, using global positioning systems (GPS)global positioning systems (GPS)global positioning systems (GPS) linked to radar and to satellite technology. On a regional basis, the FFA is perhaps the most progressive organization in the world in its development and implementation of such a system for use in the South Pacific. The VMS system adopted by the FFA, after almost two years of development, went "live" at the beginning of June 1998 – about three weeks before this Workshop. It is currently the most advanced system and tool available to assist in MCS managers in their surveillance and enforcement operations.

This system was initiated through the development of a business plan in 1995 to determine the medium- and long-term requirements and benefits of such an MCS tool. Inmarsat C combined with GPS best matched the business requirements of the FFA member countries. The automatic location communicators (ALCs)automatic location communicators (ALCs)automatic location communicators (ALCs) are a requirement for all vessels fishing in the western and central Pacific, and the type will be certified by FFA to ensure that they are compatible with the system that has been developed. VMS is one tool of the many available to the MCS manager, but this tool permits real-time monitoring of position, speed and direction on a fixed reporting schedule, or as polled from the central hub. In conjunction with the other tools available – including observers, air surveillance, at-sea boardings, port boardings, sightings, logbooks, reports of positions and catches – VMS completes the MCS system. If used to its full potential, it can greatly assist in patrol planning and cost-effective execution of a regional or country MCS plan for conservation and protection of its marine resources.

There are many questions surrounding the implementation of the VMS, from benefits of the system, security of data, to the real-time capability of the system. The answers to many of these questions are appended to this paper in the form of two annexes prepared by the professionals at FFA (see Annexes A-1 and A-2). However, in summary, the benefits of VMS include:

- (i)The provision of a real-time picture of licensed vessels operating in each country's zone for its patrol assets. Real-time information permits more cost-effective targeting of expensive patrol assets to identified problem areas, e.g., response to an observer report, closed-area monitoring, immediate and on-task flexibility in planning of air surveillance to areas

- where no VMS responses are being received from radar contacts, verification of reports of a vessel active in an unlicensed area, or in conjunction with an unlicensed vessel, etc.
- (ii) VMS currently will provide timely data on vessel positioning for cross-checking and verification against other MCS reports, such as catch and effort, zone entry/exit, transshipment, etc., and therefore becomes a deterrent to mis-reporting of position. A later, phased, development will permit on-site catch reporting from the high sea for both the monitoring country and the fleet owner.
 - (iii) Accumulation of vessel fishing position data will provide member countries with an accurate database of fishing patterns, fishing grounds, and – with cross referencing – catch rates. This will be of assistance in future patrol planning and setting priorities for scientific assessment.
 - (iv) VMS can improve communications and liaison between member countries and DWFNs to detect possible illegal activities, and can also serve as corroborative proof of legal activities.
 - (v) Careful VMS monitoring and cross-checking can result in improved data on catch and effort reporting, and, possibly, increase revenues to member countries from better knowledge of fish stock removals in their areas.
 - (vi) An aspect not fully explored to date is the potential benefit to the private sector from the implementation of such a system for fleet management; catch management; early identification of potential problem activities; and vessel and crew safety. The catch management aspect may also permit better production and processing planning, thereby maximizing the potential value-added benefits to the fishing crews and the vessel owner and minimizing waste.
 - (vii) VMS tracking, real-time and later analysis can result in better compliance with management regimes and thereby enhance the health of the targeted fish stocks.
 - (viii) Other utilization of VMS for surveillance and enforcement activities other than fishing can be a secondary benefit of the system, e.g., detecting illegal transshipping between a fishing vessel and an unidentified craft, identification – in conjunction with other mechanisms – of an unlicensed vessel carrying out suspicious manoeuvres, etc.
 - (ix) The regional aspect of the system will permit coordination and sharing of intelligence and information on fishing activities between member countries and therefore potentially ensure greater compliance of DWFN vessels.
 - (x) The regional system also permits a wider coverage of the vessel traffic and thereby provides the potential for better coordination between member countries for cost-effective joint MCS operations.

The FFA member countries have decided on a communal VMS as this minimizes costs for each country (individual systems would cost \$US 360 000 per country), and also provides the potential, as noted above, to share information on a wider geographic basis. This reduces the cost of the software required, reduces the cost of the software maintenance contract and provides regional consistency in operations. The cost of the system operations is to be recovered from the fees levied against each vessel. The total cost of running the VMS is estimated at \$US 844 500/year, or approximately \$US 900/year/vessel, assuming 1 000 vessels. The 1997 regional register had 1 297 vessels of several types registered to operate in the region. It is expected that a similar number will register in the future. This cost in terms of the cost of vessel operations for a purse seiner equates to approximately 0.03% annually. The cost recovery system to be utilized will be the same as that for the Regional Register. The current system provides for one computer monitor and printer in

each country, linked to the FFA hub. It is intended in the future that each country would have two linked systems, one for fisheries and one for the MCS unit, many of the latter units being resident in the Navy or the National Police.

One of the important questions with respect to the VMS, both in the design phase and in implementation, was security of data. Confidentiality of the VMS data was, and remains, a major issue for both the FFA member countries and the fishing nations. The FFA has inserted a comprehensive security system into the VMS link from the vessel to the Land Earth Station (LES) via satellite; at the LES site in Perth Australia; on the communications link from Perth to FFA; with borderware software at FFA, and a two-tier physical security system around the FFA MCS offices; and finally through a near-military-grade encryption system for the communications to and from the member countries. Although the system can be compromised, it would take both time and considerable funding. The member countries believe that FFA has the most appropriate security arrangements for the system at this time, as confirmed by a third-party security assessment company.

5. SUMMARY.

To date, the FFA has progressed in thirteen years from a regional agency without an MCS system to one that is the most progressive in the world. It is an example of commitment to conservation, collective cooperation to address the needs of the small island developing countries, and successful implementation of existing MCS technology for the benefit of all member countries. The combination of the regional register, air surveillance, observers, at-sea and port inspections, reporting requirements, shared MCS infrastructure and operational information, and the new VMS, all supported with harmonized legislation, combine to form a very powerful collection of MCS tools for the conservation and protection of the western and central Pacific marine resources and their habitat. The advanced systems in use in the FFA member countries can be used as an example for all developing countries as well as many industrialized nations.

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- (i) *The Convention establishing the South Pacific Forum Fisheries Agency* (FFA Convention)
 - (ii) *Treaty on Fisheries Between the Governments of Certain Pacific Island States and the Government of the United States of America* (Multilateral Treaty of Fisheries)
 - (iii) *Cooperation in the Management of Fisheries of Common Concern (termed the Nauru Agreement)*. Note: This formed the basis for the development of the *Harmonized Minimum Terms and Conditions for Foreign Fishing Vessels Access*.
 - (iv) *Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific (the Wellington Convention)*
 - (v) *Procedures for the Operations of the Regional Register of Foreign Fishing Vessels*

- (vi) *Niue Treaty on Cooperation in Fisheries Surveillance and Law Enforcement in the South Pacific Region*. Note: The member countries, courtesy of the legal division of FFA, have a pro forma subsidiary agreement and guidelines for implementation of the Niue Treaty for their reference in these activities.
 - (vii) *Palau Arrangement for the Management of the Western Pacific Purse Seine Fishery*
 - (viii) *The Federated States of Micronesia Arrangement for Regional Fisheries Access*.
 - (ix) *United Nations Convention on the Law of the Sea of 1982 (UNCLOS 1982)*
 - (x) *Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish stocks and Highly Migratory Fish Stocks*. Note: Although not yet in force, the spirit of this Agreement is being respected in the ongoing new wider regional fisheries initiative for the *Multilateral High-Level Conference on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific*.
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ANNEX A-1**OPERATOR'S VMS QUESTIONNAIRE****•What are the likely VMS conditions of operation which may be placed on my Member Country licence?**

The operator of a foreign fishing vessel shall install, maintain and operate a registered automatic location communicator (ALC) at all times and in accordance with the manufacturer's specifications and operating instructions, and FFA standards.

The operator of a foreign fishing vessel shall ensure that no person tampers or interferes with the ALC and that the ALC is not altered, damaged or disabled.

The operator of a foreign fishing vessel shall ensure that the ALC is not moved from the agreed installed position or removed without the prior permission of the licensing authority.

The operator of a foreign fishing vessel shall ensure that the ALC is switched on and is operational at all times when the vessel is within the EEZ of the licensing country.

The operator of a foreign fishing vessel or their authorized agent, upon notification by the licensing country or appropriate authority that the vessel's ALC has failed to report, shall ensure that reports containing the vessel's name, call sign, position (expressed in latitude and longitude to minutes of arc), and date and time of the report, are communicated to a delegated authority at intervals of 8 hours or such shorter period as specified by the delegated authority, commencing from the time of notification of the failure of the ALC. Such reports must continue until such time as the ALC is confirmed operational by the licensing country or appropriate authority.

If it is not possible to make any one or more of the further position reports as above, or when the delegated authority so directs, the master of the vessel must immediately stow the fishing gear and take the vessel directly to a port identified by the licensing country or appropriate authority, and, as soon as possible, report to the delegated authority that the vessel is being, or has been, taken to port with gear stowed.

•Do I have to connect a communication device to my ALC?

No. There is no requirement to install a communication device, such as a laptop computer or purpose-built data terminal, at this time.

•Can I use my ALC as an additional means of secure communications if I choose?

Yes. Whilst the FFA member countries' VMS does not require a communications device to be connected to the ALC (at this time), it is a relatively simple matter to connect a laptop computer, and, if desired, a printer, to the ALC for communication purposes. Connecting a communications device enables secure satellite communication to other vessels carrying ALC's, or to any land-based ALC, telex, facsimile machine, or personal computer and modem. The connection of a printer to the ALC will also provide for the automatic printing of any incoming messages, including regional weather reports or maritime warnings. Land-based operators wishing to communicate with the vessel can purchase specific software which will enable e-mail or text communication from a personal computer or modem to the vessel.

•Can I use this system to track my own vessel/s?

Yes. There are several software packages now available in the market place which provide for secure automated company-based tracking of vessels.

•Who has to register on the FFA member countries' VMS register?

Essentially any operator who is required to register their vessel on the FFA Regional Register of Foreign Fishing Vessels in order to fulfil the good-standing requirement will be required to register on the VMS register.

•When will I have to register on the FFA member countries' VMS Register?

FFA Member Countries will decide when to legally apply the requirement for a vessel to carry an operational FFA-type-approved ALC within their respective EEZs. The requirement to carry an operational ALC will be communicated to operators by the relevant Member Country licensing authority (as soon as practical) with a view to giving operators sufficient time to arrange for the purchase and installation of the ALC.

It should be noted that operators wishing to fit ALC's in anticipation of a given Member Country's advice are free to do so. For example, it may be more convenient for operators with vessels currently under refit to have an ALC installed now rather than wait for formal application of the system which may occur at a less convenient time.

To register early, refer to the Guide, and simply follow the steps as outlined in Steps 1-6 of Chapter 1 using the application form contained in Annex 6 to Chapter 2.

•If I already have an ALC on my vessel which is of a type approved by the FFA, does it automatically qualify me for registration?

Whilst your ALC may be of a type already approved by the FFA, this will need to be confirmed. Secondly, the ALC may not have been fitted by an approved agent. In order to ensure that the unit is of the correct type, and installed and configured correctly, it will be necessary to arrange for an inspection and, where appropriate, modification by 1) an approved agent, or 2) the VMS officer located in the relevant Member Country. To make arrangements for an inspection, you should contact the VMS Administrator at FFA Headquarters, Honiara, Solomon Islands on telephone +(677) 21124.

You should still complete the application to register your ALC on the VMS register and ensure that you note that the unit was installed prior to the introduction of the FFA member countries' VMS.

•What if I have to replace my ALC or swap it from one vessel to another?

Once an ALC is fitted to a vessel and registered it can only be removed from the vessel upon prior permission being granted by the licensing country. If another ALC is to be fitted, this ALC will be treated as a new installation for the purpose of registration, although no registration fee will be payable until the balance of the original ALC registration period runs out.

•Why do I have to use an *Inmarsat C* ALC?

In order for any ALC to qualify for type approval, it must first meet the performance specifications as contained in the "Certification Requirements for Automatic Location Communicators".

The "Certification Requirements for Automatic Location Communicators" were designed to ensure that the ALC offered up for certification meets the stringent standards necessary for the operation of an effective surveillance system.

Manufacturers of other systems – such as Inmarsat A, B and Argos – were free to apply for type approval; however, no applications were received as these systems appear to have lacked several of the necessary prerequisites required to gain FFA type approval.

For example, Inmarsat offers a number of different types of service formats using the same satellites. Many large vessels currently use Inmarsat A or its digital successor, Inmarsat B.

Inmarsat M is a smaller and lower speed format but essentially provides similar services to A and B.

The main reason that Inmarsat A, B and M are not suitable for Monitoring, Control and Surveillance (MCS) purposes is that these formats do not have automated position reporting systems. They only provide the equivalent of a telephone line and therefore an “end to end” type of service, on which it may be possible to build a position reporting system. Considerable effort would be required to satisfy the security requirements of surveillance, especially in terms of establishing the authenticity of the position source, minimizing risk to the integrity of the system from operator interference, and the additional reliability burdens required by end-to-end systems.

The preferred system for MCS use is Inmarsat C, which is substantially different from the other formats offered. Inmarsat C is not an “end to end” system; rather it is a “store and forward” system where the data is not immediately sent all of the way from the sender to the receiver. The message is stored in intermediary locations such as an Inmarsat Land Earth Station (LES) before forwarding to the final recipient. This is obviously inappropriate for voice communications but it is most appropriate and less costly for e-mail and telex-like messages.

Inmarsat C, by definition of the Inmarsat Organization, includes an automatic reporting system, making it highly suitable as an off-the-shelf monitoring system for use for many monitoring systems in both land and maritime applications. The ALC can be programmed to report at set time intervals. Programming of the time intervals can be done remotely from a monitoring station via the satellite communications system. The transceiver can receive and process other commands, such as a request to send the current position of the vessel immediately. Position fixing is done using a GPS receiver integrated into the Inmarsat C transceiver.

•Will the equipment take up limited bridge space?

No. An ALC is approximately the size of a car cassette player, and can be easily accommodated on the bridge of even small fishing vessels. The smallest vessel which was equipped with a VMS during the FFA technical trial was only 7 m LOA, and even on a vessel this small, the ALC was easily accommodated and was not intrusive in the limited cabin space.

SECURITY OF INFORMATION

The FFA Member Country VMS relies on tried and proven technology, namely Inmarsat C and International X.25 packet switching protocols, for the security of data transfer from vessels at sea to the FFA VMS hub site.

Inmarsat C technology and the X.25 packet switching have multiple built-in security features and have been used for many years by a range of security-dependent organizations such as banks and the military. These same communication protocols have also been used by fisheries agencies in Australia and New Zealand in their VMS, and these communications mediums have proven to be both reliable and secure.

Once positional information is received at the VMS hub site in Honiara via these communications protocols, it is then partitioned by country location and sent out to the authorized country VMS site. Information is relayed by either Inmarsat C, IDD or Internet. Before transfer to the Member Country site, the information is encrypted by Smart Crypt, which is a near-military-grade encryption system.

Any VMS Member Country sites requesting information from the VMS hub site in Honiara must first have the appropriate security access and clearance classification for the system to recognize the request and then respond accordingly. Security passwords are changed regularly and all requests for information are logged and auditable.

To ensure that all measures have been taken regarding physical security of information, a security review was undertaken by security experts from Australia and the findings carefully reviewed to ensure a high level of physical protection of information.

ANNEX A-2

**VMS QUESTIONS AND ANSWERS
FOR
FFA MEMBER COUNTRIES**

FACT SHEET

OPERATIONAL QUESTIONS

•What direct benefits do you see the VMS providing to our country?

Patrol assets will have a real-time picture of licensed vessels operating in each country's zone. Real-time information provides for more effective targeting of existing surveillance assets, such as patrol boats and surveillance flights. This information will reduce costly search time, and wasted time in identifying vessels which may be operating legally or illegally. Real-time application of VMS in this context translates into cost-effective management of existing surveillance assets.

By means of a catch reporting facility (to be developed in the enhancement phase), VMS will provide data timeliness, which will lead to more efficient and effective resource management. Cross referencing timely catch and position data will reduce the incidence of mis-reporting by region, and non-reporting of catch.

For each member country, the VMS will ultimately lead to an accurate database of information showing fishing grounds, patterns and catch rates, which can then be used for fisheries management purposes.

VMS will markedly improve communications within the region, especially between the fisheries management and enforcement agencies and the distant water fishing nation (DWFN) vessels, patrol craft and flights.

Careful VMS monitoring, combined with logbook inspection, may result in improvements in catch reporting compliance, i.e., fish caught in zone will be reported as such, which will result in higher fees being paid to member countries.

The VMS helps to ensure that management arrangements are being complied with. As management arrangements are linked to effective biological management, this helps to ensure the health of the fish stocks, which are a vital source of income to the region.

•Why is it so important to the FFA that the system be adopted at the regional level?

Maintaining a regional approach to VMS gives the system a robustness which would not be achievable under a fragmented system. A strong and united regional position assists in dealings with DWFNs should they attempt to delay the progress of countries implementing better controls and closer management of the regions resources.

Given the nomadic nature of DWFN vessels and the fact that the only central repository of all records relating to all DWFNs operating in the region is held on the Regional Register, it makes strategic sense to centralize the administration of VMS. This is especially important as the VMS relies heavily on the regional register for cross referencing vessel position reports against vessel details.

The importance of the central hub site becomes apparent when looking at a situation where a member country works separately, from a single site. A member country working in isolation would hold information pertaining to its licensed vessels only. If a registered (but unlicensed DWFN vessel) were to transit their zone the member country would be unable to identify this vessel, as information relating to this vessel would not be held in its own licensing data base.

Of course regional registration information is sent out to member countries on a monthly basis, and the maintenance of a member country copy of the regional register would counter this problem to some degree, but member countries wishing to operate separately from the central hub site would need to maintain an up-to-the-minute copy of the register if the system were to function efficiently. In essence, then, member countries would need to come back to the central hub (i.e., FFA) in order to maintain their own separate system.

•**Are we able to independently track our own vessels?**

Yes, it is possible to have vessels report directly to each member country. However this approach has ramifications in terms of costs, administration, and consistency.

Cost: Essentially, setting up a stand-alone VMS for each member country would require 14 complete base stations to be implemented, which in turn would require that countries purchase 14 copies of the VMS decision engine software.

Hardware would also need to be upgraded to a stand-alone level and it is estimated that the cost of purchasing the necessary hardware and software to support a stand-alone system will be in the order of \$US 360 000 per country. If all 14 member countries were to purchase a stand-alone system this would equate to an additional cost of \$US 5 040 000, which would increase the per-vessel levy (assuming 1 000 vessels operating) from the current \$US 700 - 800 to \$US 5 540 - 5 740 in year 1. After this one-off expenditure in year 1, the operational costs would fall back to \$US 700 - 800 per vessel per year.

Administration: Each member country would have to set up its own VMS registration process, levy recovery process, and service-level agreements with Aspect Computing and the telecommunication service providers. Individual service-level agreements would amount to a minimum monthly cost of \$US 1 000.

Additional staffing costs would then have to be factored-in for register and levy administration. By splitting the system, member countries also lose some bargaining power when negotiating for the lowest rates for service support.

Secondly, maintenance of the central hub demands a high degree of on-site, specialist technical expertise and support. For member countries to successfully maintain a stand-alone VMS site, this expertise would need to be duplicated across 14 countries, resulting in increased operational costs.

Consistency: Fragmenting the VMS may also lead to inconsistent application of the system across the region. Thus, over time, countries may independently choose to vary their VMS levies, licence conditions and VMS policy. Differing levies, licence conditions and policies will lead to confusion on the part of the DWFNs who fish in more than one country's EEZ.

•**What are the benefits of using the FFA hub site to relay vessel positions?**

The use of a common hub site takes advantage of economies of scale: only one copy of the decision engine software and hardware is required, and only one maintenance contract is required.

FFA will also coordinate administration, such as the VMS register, payment of communication costs, and specialist system support and maintenance. Central administration of the VMS registration system will result in cost savings.

A single hub site also helps to ensure consistency with regard to legislation and policy.

•How much will the VMS cost if we go through the hub site?

The system development, hardware and software costs were funded by Australia; therefore the only costs involved with operation of the hub site will be the fixed and variable costs associated with position reporting, system maintenance and staffing. At this time, it is estimated that these costs can be recovered via a levy against each DWFN vessel of between \$US 700 and \$US 800 (based on 1 000 vessels reporting at 4-hourly intervals).

•How does the FFA intend to recover operational costs of the VMS?

It is proposed that a VMS register be developed, with its operation mirroring that of the Regional Register.

•When will the system be ready for technical and administrative operation?

Technical activation was expected to take place on 28 November 1997, but was deferred until late May 1998 to ensure the system was fully functional prior to implementation at the country level.

It is envisaged that registration could commence as early as 1 April. This will give sufficient lead time for the DWFNs to obtain and install ALCs.

•What security measures has the Forum implemented to ensure the security of VMS data?

Boat to the Land Earth Station (LES) via Satellite Link

In order to (illegally) trap information being sent from a vessel to the LES it would be necessary to construct a major communications facility, such as another LES. It is unlikely that the information being transferred over this system would warrant such large expenditure.

Security at the LES

The Perth, Australia, LES is a major site for transfer of highly sensitive data from multiple users. The LES has a range of physical and administrative security measures in place to protect the privacy and security of the information being handled.

Security from the LES to the FFA

Position information will be transferred via X.25 from the LES to the FFA hub site. Whilst this information is not encrypted, it is broken into segments for transfer to the FFA and no one segment makes sense on its own.

In order to decode the information it would need to be trapped and then re-assembled. Even if the information were successfully trapped and assembled, the information does not identify the boat without the vessel codes held at FFA.

Security at FFA

Once the information reaches the FFA it is analysed and stored at the FFA hub site. The hub site data base is protected by a borderware system, which is a system designed to protect the data base from unauthorized entry from outside, non-authorized users.

Any action which is allowed to proceed is also audit-traceable. For example, when an authorized user conducts an action on the system, their details and activity are logged by the system for future reference should any problems occur.

FFA to Member Country – Member Country to FFA

All incoming and outgoing information is encrypted by Smart Crypt, which is a near-military-grade encryption system.

•What measures are being taken to inform DWFN fishing companies of the systems registration requirements?

FFA is currently developing a DWFN VMS guide manual. The manual will contain the following information:

- description of the VMS
- procedure for applying for registration on the VMS register
- application form for the VMS register
- application fee (levy) information
- list of type approved units
- list of approved installers
- all VMS reporting and contact numbers
- FFA help-desk contact information

•How long will the installation, and registration process take?

Physical installation of the ALC on a vessel usually takes 4-6 hours. However, it is important to note that operators will have to allow themselves sufficient time to obtain and install an ALC prior to the date on which they expect to commence fishing.

Registration of the ALC on the VMS register could be achieved within 48 hours from time of receipt of the application, but this will depend on sufficient staff resources and the number of units being registered.

•Will the system have regional technical support in terms of sales and servicing of VMS equipment, especially as some boats may be required to return to port as a result of a unit failure ?

FFA has advised the major suppliers of ALCs that it is imperative to establish a regional presence to facilitate ALC sales and servicing. Suppliers have been advised of the fleet dynamics within the region, and preferred sites for establishment of regional agencies. At this time, suppliers have expressed an interest in establishing a regional presence and are conducting research along these lines.

FFA expects that the major suppliers will position themselves for entry into the region but will not physically move until there is confirmation from the member countries as to the timing of legal application of VMS, and the numbers of vessels involved.

•Some DWFNs claim that the VMS is expensive. What is the operational cost of the VMS and how expensive is the system when compared to current operational costs faced by the DWFN vessels?

Cost: The estimated running cost of the FFA member countries' VMS is \$US 844 500/year, or approximately \$US 845 per vessel per year (for 1 000 vessels). There were 1 272 vessels of several types registered with the FFA at the conclusion of the 1996/97 Regional Register year on 31 August 1997. It is expected that a similar number of vessels will register with the FFA Secretariat during the 1997/98 registration year.

In 1996, the estimated value of tuna production from the central and western Pacific by all fleets was \$US 1 647 million. The estimated annual running costs of the VMS is approximately 0.05% of this amount.

Compared with the cost of operating a purse seine fishing vessel in the central and western Pacific (\$US 2.9 - 3.8 million/year), the estimated annual VMS running cost per vessel is a comparatively small amount (approximately 0.03%).

- **Some DWFNs have expressed concern that the FFA VMS ignores other systems which are currently carried by DWFN vessels and which they believe could be used for reporting to the FFA VMS.**

There are a number of other communication systems currently in use by various DWFN vessels. For example, Inmarsat offers a number of different types of service formats using the same satellites. Many large vessels currently use Inmarsat A or its digital successor, Inmarsat B. Inmarsat M is a smaller and lower-speed format but essentially provides similar services to A and B.

The main reason that Inmarsat A, B and M are not suitable for Monitoring, Control and Surveillance (MCS) purposes is that these formats do not have automated position reporting systems. They only provide the equivalent of a telephone line and therefore an “end to end” type of service on which it may be possible to build a position reporting system. Considerable effort would be required to satisfy the security requirements of MCS, especially in terms establishing the authenticity of the position source, minimizing risk to the integrity of the system from operator interference, and the additional reliability burdens required by end to end systems.

The preferred system for MCS use is Inmarsat C, which is substantially different from the other formats offered. Inmarsat C is not an end-to-end system; rather it is a store-and-forward system, where the data is not immediately sent all of the way from the sender to the receiver.

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Inmarsat C, by definition of the Inmarsat Organization, includes an automatic reporting system, making it highly suitable as an off-the-shelf monitoring system, and is used for many monitoring systems in both land and maritime applications. The transceiver can be programmed to report at set time intervals. Programming of the time intervals can be done remotely from a monitoring station via the satellite communications system. The transceiver can receive and process other commands, such as a request to send the current position of the vessel immediately. Position fixing is done using a GPS receiver integrated into the Inmarsat C transceiver.

- **Some DWFNs claim that the equipment is bulky and takes up limited bridge space.**

An ALC is approximately the size of a car cassette player and can be easily accommodated on the bridge of even small fishing vessels. The smallest vessel equipped with a VMS during the technical trial was only 7 m LOA, and even on a vessel this small the ALC was easily accommodated and was not intrusive in the limited cabin space.

LEGAL ISSUES

- **Do the contracts that FFA signed in relation to the implementation of VMS bring with them any legal obligations at national level?**

Two contracts govern the technical aspects of VMS. These are the contract between FFA and Aspect Computing, and between FFA and Telstra.

FFA - Aspect Computing contract

The FFA-Aspect Computing contract deals with the development and implementation of technical aspects of VMS. The parties to this contract are Aspect Computing Ltd, of Canberra, Australia

(the Contractor) and the South Pacific Forum Fisheries Agency (the Customer). The Contractor is an Australian-based systems integration (information technology) company.

Implications for the member countries

Generally, there are no direct implications arising from the FFA-Aspect Computing contract for member countries. The contractual relationship between Aspect and the Agency is based on the premise that FFA seeks the installation of a FFA member countries' VMS and Aspect is the supplier and developer of that system. It is purely a commercial contractual arrangement between the Customer and the Contractor.

Indirectly, as part of the "System", the member countries will receive hardware, training of identified personnel to operate the system, software developed and supplied for the member countries through the Secretariat as the operational centre of the "System", positional data of vessels within their EEZs, and – in a later phase – catch data.

FFA-Telstra contract

This Contract governs the relationship between Telstra and FFA in the communication link between FFA and fishing vessels. The contract does not deal with communication between FFA and member countries. Under the Contract, Telstra undertakes to:

- provide FFA with satellite low-speed data communication services for the provision of communications between FFA and fishing vessels;
- use the PSDN (X.25) for communications between FFA and Satcom-C services;
- provide the messaging, polling and data reporting services (including direct forwarding) provided by Satcom-C services.

For these services, FFA has to pay to Telstra certain charges (FFA obligations). The contract period is 24 months from the date of execution, or until otherwise terminated in accordance with the terms of the Contract.

Implications for member countries

The FFA-Telstra Service Contract has no legal implications for FFA member countries. The Service Contract is restricted to communications chains between the fishing vessels and FFA. The communications link between FFA and member countries is not part of this Contract.

An issue that needs to be fully considered and resolved is communication between FFA and member countries. In due course, this may involve agreement covering administration and security. This issue will be on the agenda for discussion at the proposed VMS legal workshop in early 1998.

•What is the Legal Basis for VMS in the EEZ?

The legal basis for VMS as a compliance tool in the EEZ derives from the sovereign rights and enforcement powers of coastal States in their EEZs, as agreed in the United Nations Convention on the Law of the Sea (UNCLOS 1982). The pertinent provisions to note are the following:

- Article 56 gives coastal States sovereign rights for the purpose of conserving and managing the living resources in their EEZs.
- Article 62(4) requires that nationals of other States fishing in the EEZ of the coastal State must comply with the conservation and management measures and with the other terms and conditions established in the laws and regulations of the coastal State. The laws and regulations that the coastal State may promulgate may include "specifying information required of fishing vessels, including catch and effort statistics and vessel position reports."

–Article 73, dealing with the enforcement powers of the coastal State, gives power to the coastal State, in the exercise of its sovereign rights, to “take such measures, including boarding, inspection, arrest and judicial proceedings, as may be necessary to ensure compliance with the laws and regulations adopted by it” in conformity with the Law of the Sea Convention.

•Will VMS apply to vessels fishing on the high seas?

Under international law, the high seas are open to all States for the purpose of exercising their freedoms of the high seas. One of the freedoms of the high seas is the freedom of fishing. As a general rule of international law, ships on the high seas (including fishing vessels) are subject only to the jurisdiction of the flag State. It follows that in-zone VMS cannot regulate foreign fishing vessels operating on the high seas without the agreement of the flag States.

•Is it Legally Possible for VMS to be implemented without changes being made to national legislation?

There are two ways in which VMS can be implemented at the national level. One way is as a condition of a fishing licence. The other is by legislation. Member countries that have provisions in their fisheries legislation allowing conditions to be attached to foreign fishing licences can implement VMS through permit conditions. There will need to be appropriate reflection of that in any bilateral access agreement. This will not require any legislative changes in the short term.

•What changes might have to be made to national legislation in due course?

Implementing VMS solely as a condition of a licence cannot deal with all the complex legal issues that will arise. Changes will need to be made to national legislation in due course, reflecting these legal complexities. The areas where legislation or regulation might be considered include:

- (i) implementation of changes to harmonized regional arrangements, such as the Minimum Terms and Conditions of Access;
- (ii) imposition of penalties for violations of VMS conditions;
- (iii) admissibility of evidence;
- (iv) data protection and security measures; and
- (v) data ownership.